2023. M80BC 2023L562G2EL

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2023

Design & Communication Graphics

Ordinary Level
Section B and C (180 marks)

Thursday, 22 June
Morning, 9:30 - 12:30

This examination is divided into three sections:

SECTION A	(Core - Short Questions)
SECTION B	(Core - Long Questions)
SECTION C	(Applied Graphics - Long Questions)

SECTION A
- Four questions are presented.
- Answer **any three** on the accompanying A3 examination paper.
- All questions in Section A carry **20 marks** each.

SECTION B
- Three questions are presented.
- Answer **any two** questions on drawing paper.
- All questions in Section B carry **60 marks** each.

SECTION C
- Five questions are presented.
- Answer **one** question (i.e. the option you have studied) on drawing paper.
- All questions in Section C carry **60 marks** each.

General Instructions:

- *Construction lines must be shown on all solutions.*
- *The graphics presented are not necessarily drawn to scale and must not be used for scaling purposes.*
- *Write the question number distinctly on the answer paper in Sections B and C.*
- *Work on one side of the drawing paper only.*
- *All dimensions are given in metres or millimetres.*
- *Write your Examination number in the box provided in Section A and on all other sheets used.*

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The 2023 examination papers were adjusted to compensate for disruptions to learning due to COVID-19. This examination paper does not necessarily reflect the same structure and format as the examination papers of past or subsequent years.

SECTION B - Core

Answer **any two** questions from this section on drawing paper.

B-1. The image on the right shows an outdoor play area in the shape of a boat.

Fig. B-1 below shows an isometric view of a similar boat.

(a) Draw an elevation of the boat looking in the direction of the arrow.

(b) Project a plan from the elevation.

(c) Draw the auxiliary elevation of the ***boat***, projected from the plan, which will include the true shape of surface **A**.

Scale 1:1

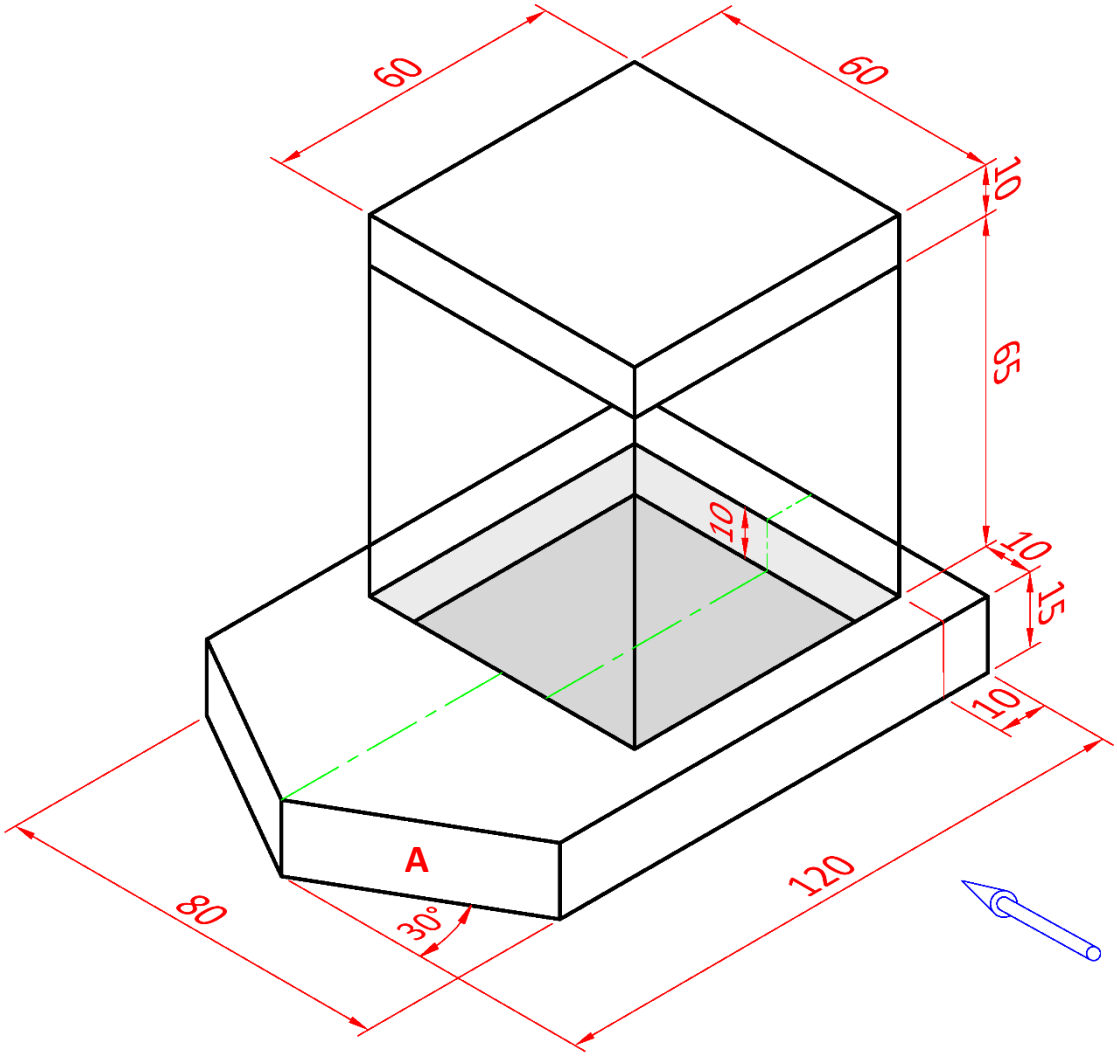


Fig. B-1

B-2. The image on the right shows a modern A-frame house. The house consists of an equilateral triangular prism which is intersected by a second triangular prism.

Fig. B-2 below shows the elevation and incomplete plan of a similar house. The outline profile of the second intersecting prism is also shown on the right below. A 3D graphic is also given.

(a) Draw the given elevation and incomplete plan of the house.

(b) Complete the plan, showing all lines of interpenetration.

(c) Draw an end view of the house.

Scale 1:1

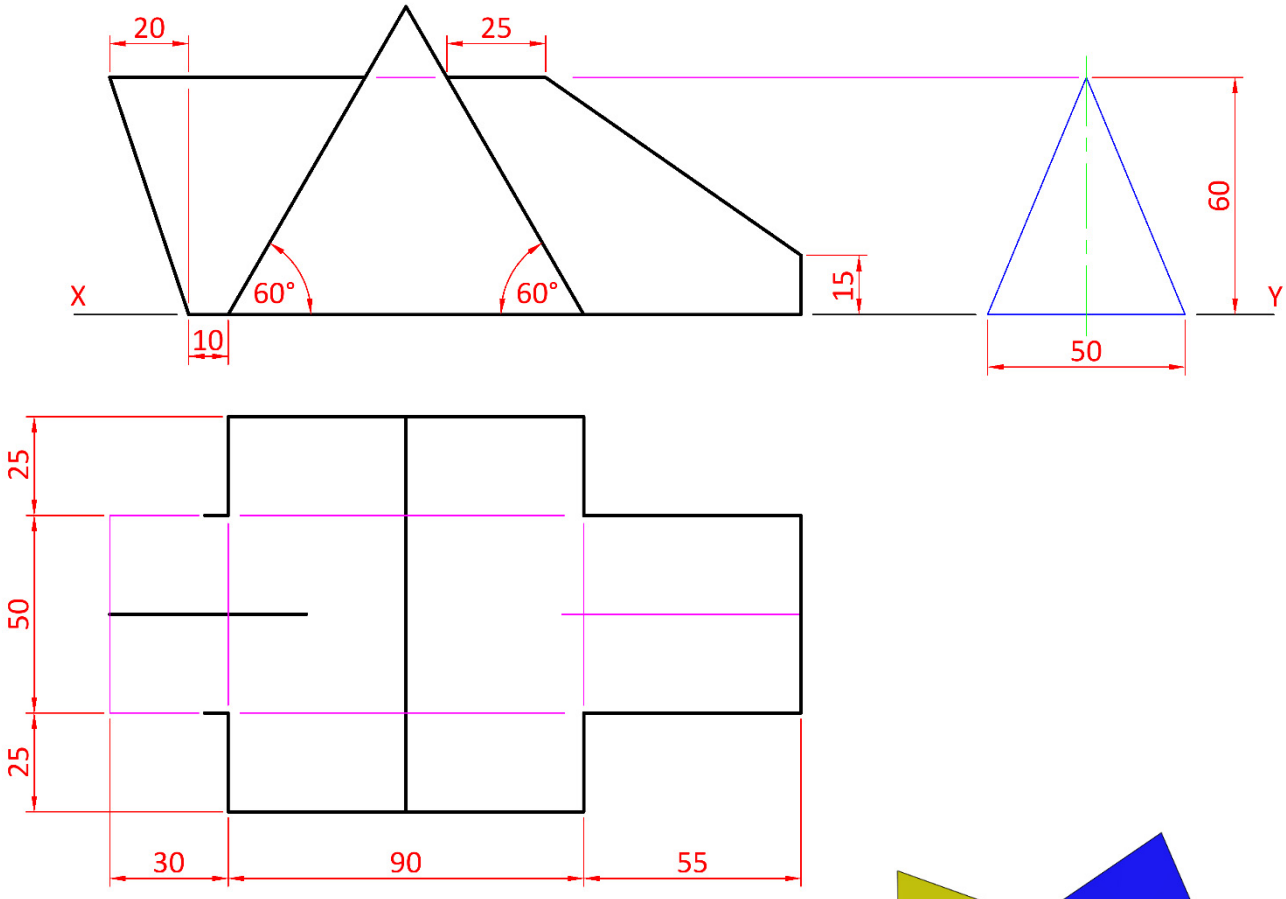
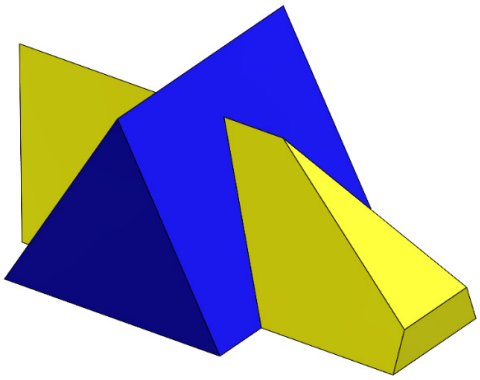


Fig. B-2



B-3. The image on the right shows a wooden arbor bench. Fig. B-3 below shows an incomplete isometric projection of a similar arbor bench.
A 3D graphic is also given.

The elevation and plan of the arbor bench are shown in their required positions.

(a) Draw the given equilateral triangle **abc** and the axonometric axes **X**, **Y**, and **Z**.

(b) Draw the elevation and plan positioned as shown.

(c) Draw the axonometric projection of the outline of the arbor bench.

(d) Complete the axonometric projection of the inner seating area including the semi-circular top.

Scale 1:1

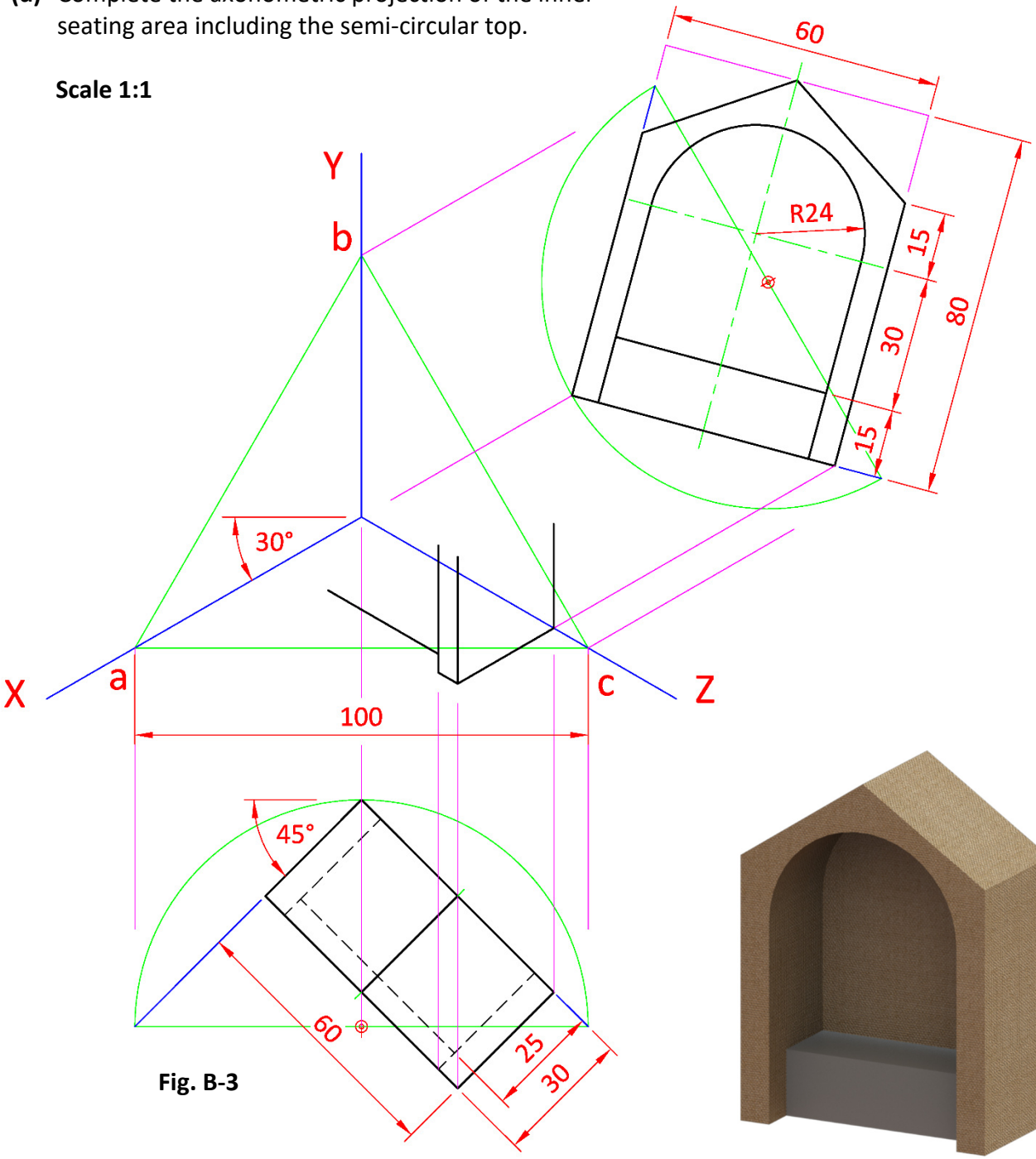


Fig. B-3

SECTION C - Applied Graphics

Answer **one** question (i.e. the option you have studied) from this section on drawing paper.

Geologic Geometry

C-1. The image on the right shows a section of roadway which required cuttings to accommodate it.

The accompanying map, located on the back page of Section A, shows ground contours at five metre vertical intervals.

(a) On the map supplied, draw a vertical section (profile) on the line **AB**.

(b) **CD** is the centreline of a proposed roadway which is level at an altitude of 20 m.

Using side slopes of 1 in 1 for the cuttings, complete the earthworks necessary to accommodate the roadway.

***Note**: The earthworks on the southern side of the roadway have already been completed.*

Scale 1:1000

C-2. The image on the right shows a seating area on a beach which has a canopy based on a hyperbolic paraboloid.

Fig. C-2 below shows the projections of a similar hyperbolic paraboloid surface.

(a) Draw the plan and elevation of the given hyperbolic paraboloid surface.

(b) Project an end view of the surface.

Scale 1:1

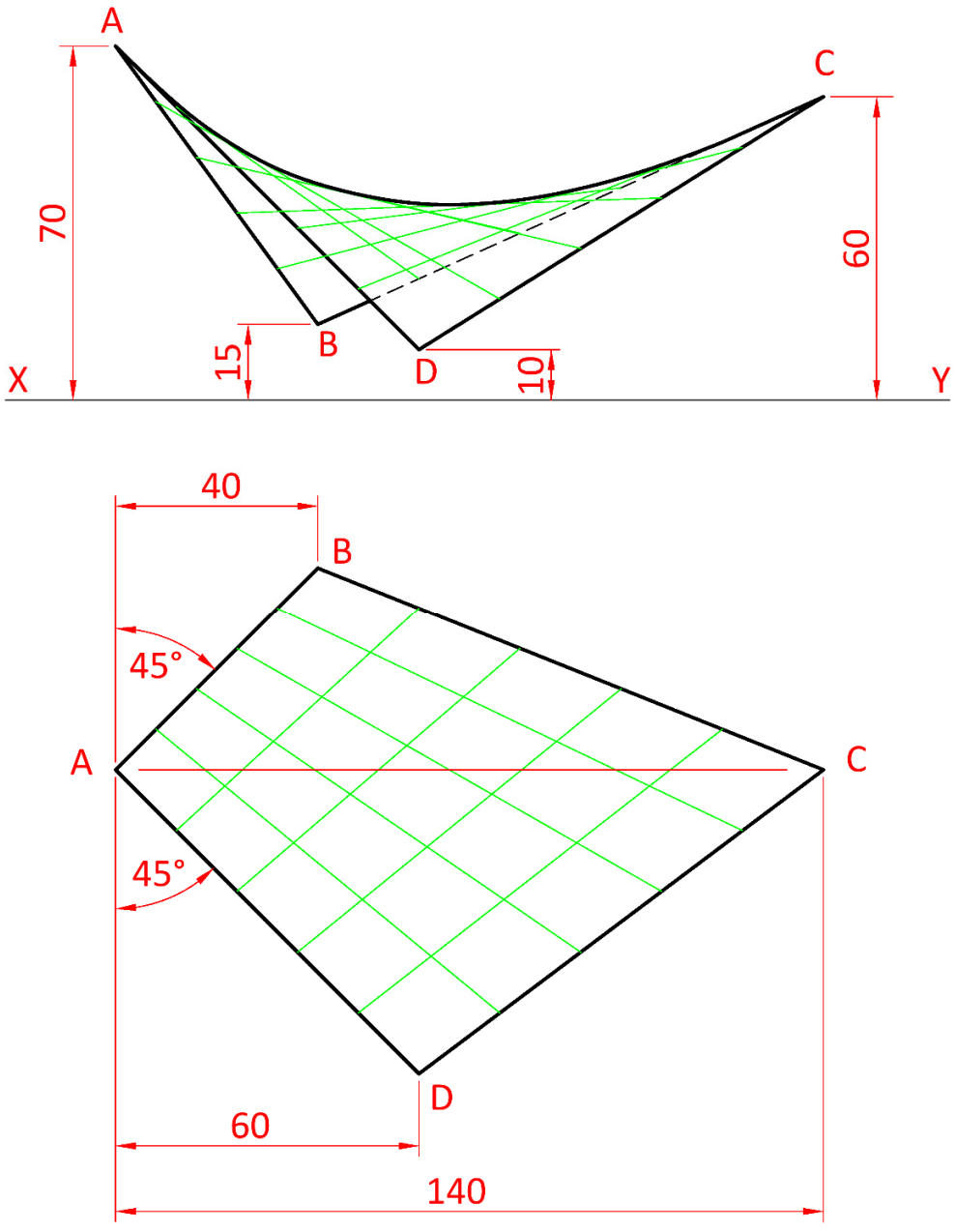


Fig. C-2

C-3. The image on the right shows a storage box for BIC biros.

The projections of a similar storage box are shown in Fig. C-3 below. A 3D graphic is also given.

(a) Draw the given elevation and end view of the storage box.

(b) Project a plan.

(c) Draw a one-piece surface development of the storage box.

Scale 1:1

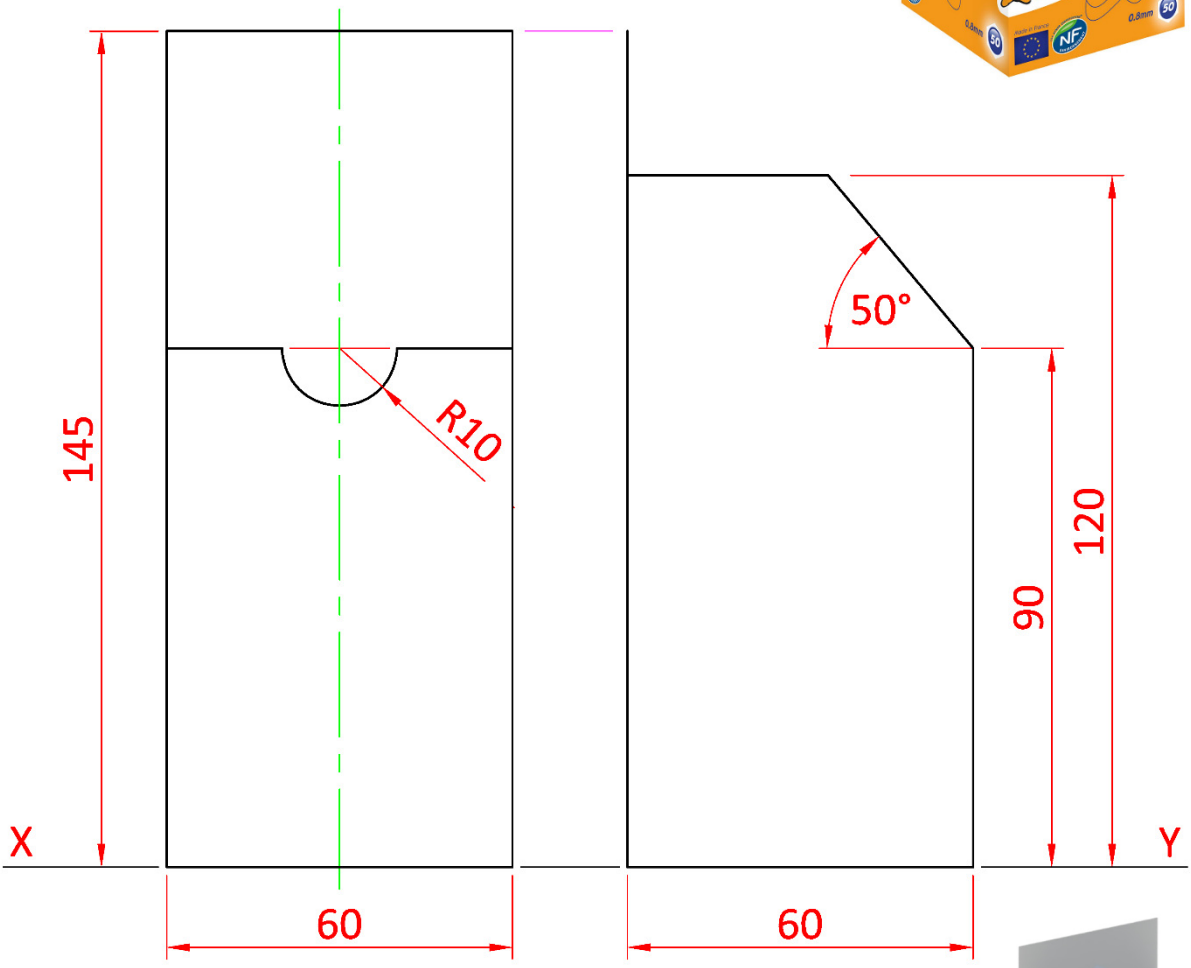


Fig. C-3

C-4. **(a)** The image below shows an airport control tower. The tower staircase is based on a helix.

Fig. C-4 opposite shows the projections of the tower and partially completed helix.

(i) Draw the given elevation and plan of the tower.

(ii) Complete the projections of the helix which moves in a clockwise direction from point **A** on the base to point **B** in one revolution.

Scale 1:1

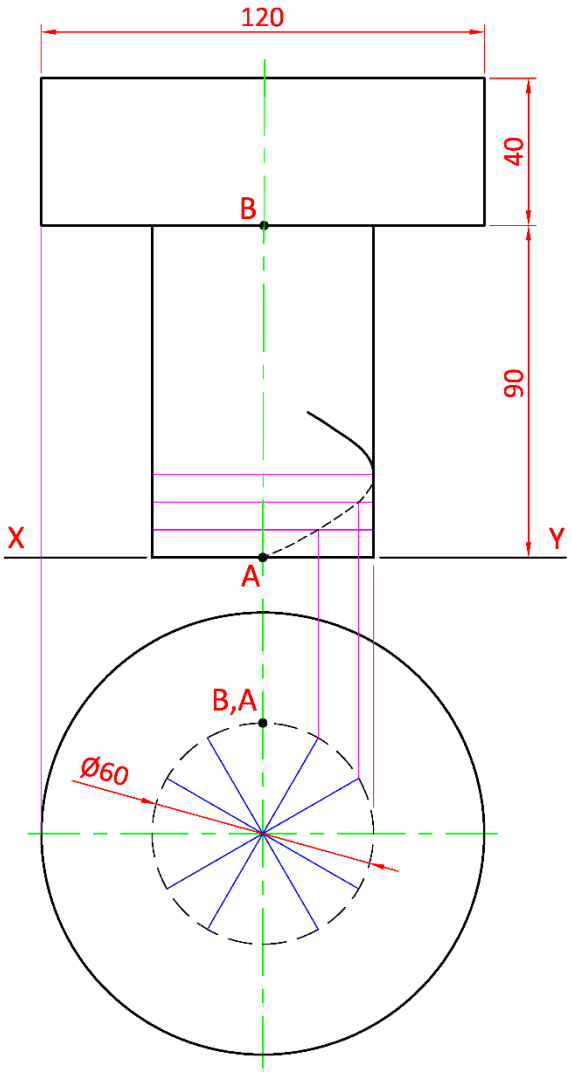
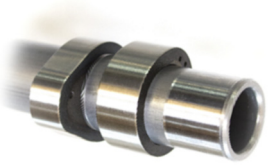


Fig. C-4

(b) A cam from the fuel system of a DAF truck is shown.



The cam imparts the following motion to the follower:

- 0° to 90° Rise 60 mm with uniform velocity
- 90° to 180° Dwell
- 180° to 360° Fall 60 mm with simple harmonic motion.

Draw the displacement diagram, using a distance of 15 mm to represent each 30° interval.

Note: It is not necessary to draw the cam profile.

Assemblies

C-5. The image on the right shows a lava lamp which is often a colourful feature in a young person's room.

Details of a similar lava lamp are shown in Fig. C-5 below.

A parts list and a 3D graphic of the lava lamp are also shown.

Draw the **sectional elevation A-A** of the assembled lava lamp.

(*Any omitted dimensions may be estimated.)*

Scale 1:1

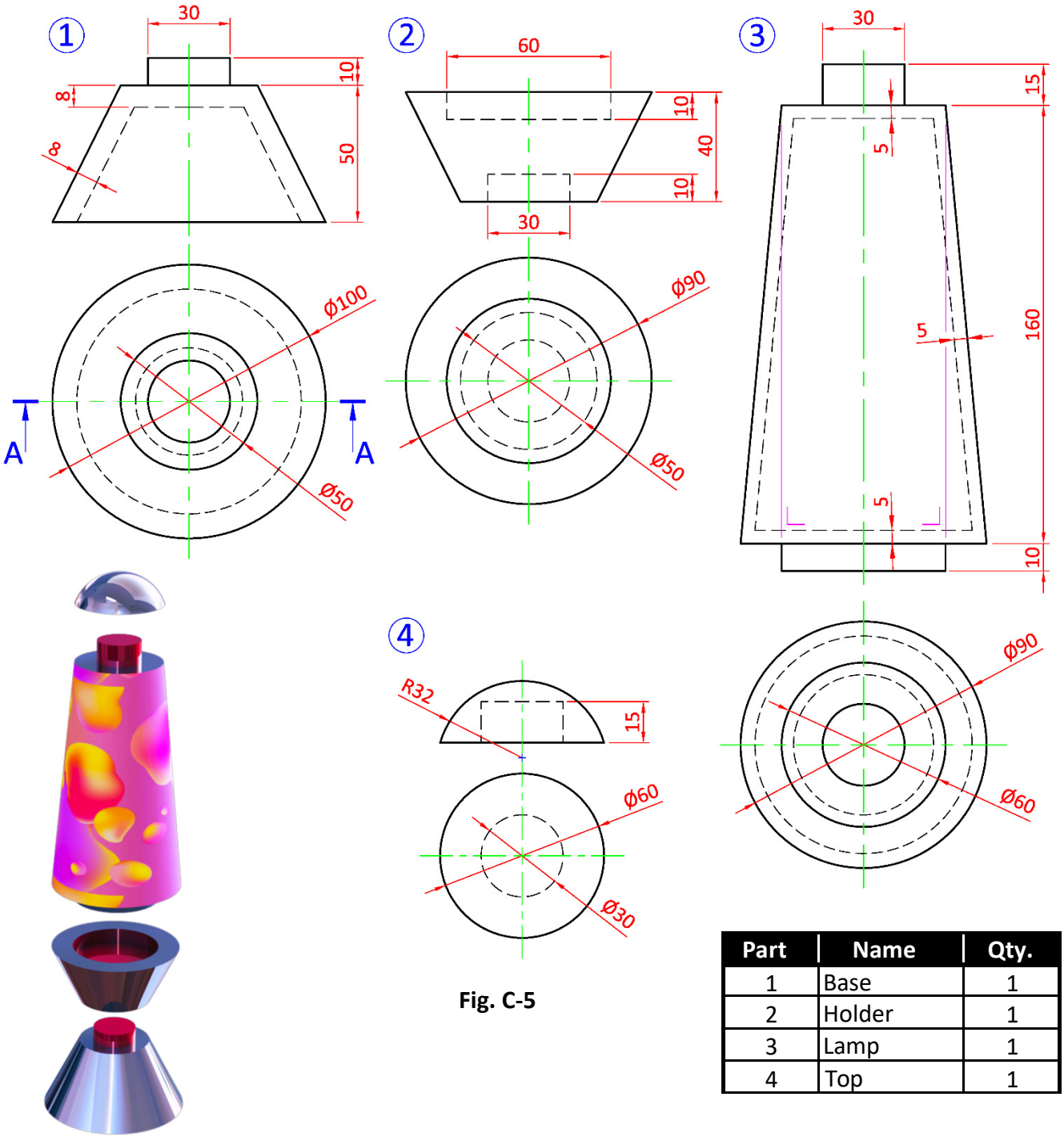


Fig. C-5

Part	Name	Qty.
1	Base	1
2	Holder	1
3	Lamp	1
4	Top	1

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